Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Improving Public Safety Communications in the 800 MHz Band	)	
	)	
	)	WT Docket No. 02-55
Consolidating the 900 MHz Industrial/Land Transportation and Business Pool Channels	)	
	)	
	)	

To: The Commission

COMMENTS OF

ASSOCIATION OF PUBLIC-SAFETY COMMUNICATIONS OFFICIALS-INTERNATIONAL, INC.

NATIONAL ASSOCIATION OF COUNTIES

NATIONAL LEAGUE OF CITIES

NATIONAL ASSOCIATION OF TELECOMMUNICATIONS OFFICERS AND ADVISORS

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SUMMARY

The Commission must address the serious interference problems facing public safety licensees throughout the 800 MHz band. While case-by-case interference remedies are important, long-term solutions will require changes to the current 800 MHz band allocations. The underlying factors creating the potential for interference need to be eliminated before the interference actually occurs and threatens the safety of life and property.

The need to reconfigure the 800 MHz band provides an opportunity to address serious, unmet public safety spectrum requirements. The findings of the 1996 Public Safety Wireless Advisory Committee (PSWAC) continue to be largely accurate. If anything, PSWAC underestimated actual public safety demand for spectrum. While additional spectrum has been allocated for public safety since 1996, that spectrum is either blocked by television broadcast operations in the metropolitan areas where it is needed the most (*i.e.*, the 700 MHz band), or is necessarily limited to broadband, relatively short distance data transmissions (*i.e.*, 4.9 GHz).

The events of September 11 have also increased demand for public safety spectrum, which is needed to provide additional capacity and to implement new communications tools for police, fire, EMS and other public safety personnel. Additional 800 MHz spectrum is also critical for the development of new and expanded interoperable, multi-agency radio communication systems.

Plans to reconfigure the 800 MHz must, therefore, be evaluated based upon the reduction in interference, whether the plan includes a mechanism to reimburse all of the implementation costs incurred by public safety licensees, and whether the plan will provide significant additional spectrum for public safety use in the 800 MHz band.

The Nextel proposal would modify the 800 MHz band in a manner that should reduce substantially the potential for interference, and lays the foundation for more complete

elimination of the interference problem with future improvements in equipment and system design. The Nextel plan also attempts to address the significant costs that public safety licensees would incur, though it still falls well below what is likely to be necessary. Importantly, the Nextel plan yields a significant amount of additional public safety spectrum.

In contrast, while the National Association of Manufacturers (NAM) have proposed a plan that should also reduce interference problems, it has not even attempted to resolve the issue of cost. Nor does the NAM plan provide for additional public safety spectrum.

Any reconfiguration of the 800 MHz band will also require provisions to ensure efficient and complete reimbursement of public safety licensee costs, a rational frequency coordination process utilizing the expertise of existing coordinators, accommodations for the unique Canadian and Mexican border area allocations, future incentives to adopt more efficient and interoperable systems, and long term efforts to address receiver standards, emissions limits, and system design criteria to more completely address interference problems.

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The Association of Public-Safety Communications Officials-International, Inc. ("APCO"), the National Association of Counties ("NACo"), the National League of Cities ("NLC"), and the National Association of Telecommunications Officers and Advisors ("NATOA") hereby submit the following comments in response to the Commission's Notice of Proposed Rulemaking ("*NPRM*"), FCC 02-81 (released March 15, 2002), in the above-captioned proceeding.

APCO, founded in 1935, is the nation's oldest and largest public safety communications organization. Most of APCO's over 15,000 members are state or local government employees who manage and operate communications systems for police, fire, emergency medical, forestry

conservation, highway maintenance, emergency management, and other public safety agencies. APCO is a certified frequency coordinator for Part 90 Public Safety Pool channels, including the 800 MHz channels at issue in this proceeding.[1] APCO has played a significant role in identifying and attempting to resolve the 800 MHz interference discussed in the *NPRM*, and was one of the five parties that compiled the *Best Practices Guide.*[2] APCO also formed Project 39, a special committee of public safety entities that, with assistance from an industry advisory group, has does extensive research regarding the extent and nature of the 800 MHz interference problem.[3]

The National Association of Counties (NACo) was also created in 1935, and continues to serve the nation's 3,066 counties. NACo's membership totals more than 2,000 counties, representing over 80 percent of the nation's population. NACo, is the only national organization that represents county governments in the United States. With its headquarters on Capitol Hill, NACo is a full-service organization that provides an extensive line of services including legislative, research, technical, and public affairs assistance, as well as enterprise services to its members. The association acts as a liaison with other levels of government, works to improve public understanding of counties, serves as a national advocate for counties and provides them with resources to help them find innovative methods to meet the challenges they face.

The National League of Cities ("NLC") represents 18,000,000 mayors and local elected officials from cities and towns across the country that range in population from our nation's

[1] APCO also convened and provided significant support to the 800 MHz National Public Safety Plan Regional Planning Committees.

[2] *See NPRM* at n.18.

[3] *See NPRM* at n.25.

largest cities of Los Angeles and New York to its smallest towns. NLC is the nation's oldest national association representing municipal interests in Washington.

The National Association of Telecommunications Officers and Advisors ("NATOA") is a national association that represents the telecommunications needs and interests of local governments, and those who advise local governments. The membership is predominantly composed of local government agencies, local government staff and public officials, as well as consultants, attorneys and engineers who consult local governments on their telecommunications needs.

The *NPRM* lays the foundation for the Commission to address in a comprehensive fashion several closely related communications problems confronting our nation's public safety agencies. First, is the dangerous interference that 800 MHz public safety systems are receiving, and will continue to receive absent significant changes in how the band is allocated and used by all parties. Second, is the serious shortage of radio spectrum available for public safety operations, which leads to dangerous channel congestion, blocks deployment of vital new communications technologies, and prevents implementation of interoperable, wide-area radio communications systems. Third, is the interoperability problem itself, which can be addressed in part by spectrum allocations, but also through interoperability procedures, channel allotments, and standards.

These are not easy problems to solve, and no single Commission action will provide all of the answers. However, this proceeding is a major step forward, provided, of course, that it leads to real results in a timely fashion. The communications problems facing public safety are getting worse every day, just as society is demanding more effective, efficient, and interoperable public safety communications capabilities. Solutions must be found as quickly as possible.

Unfortunately, while this proceeding is an important step, the mere pendency of the proceeding and the uncertainty that it creates could actually slow the development and deployment of new public safety radio systems. Therefore, we urge that the Commission move swiftly and decisively in addressing the issues raised in this proceeding.

The following comments will (1) describe the nature of the 800 MHz interference problem and why long-term solutions are necessary to protect public safety; (2) discuss the serious need for additional public safety radio spectrum, which is a critical element in evaluating any plan to restructure the 800 MHz band; (3) address each of the proposed band plans described in the NPRM; (4) discuss issues common to any reconfiguration of the band, such as cost, who is responsible for such costs, frequency coordination and planning, channelization, and interoperability requirements; and (5) consider "complimentary" solutions such as receiver standards, out-of-band emissions limits, and changes in the design of future public safety radio systems.

I. THE COMMISSION MUST PROVIDE LONG-TERM SOLUTIONS TO 800 MHz INTERFERENCE PROBLEMS.

The nature of the 800 MHz interference problem facing public licensees is fully and accurately described in the *NPRM*, the *Best Practices Guide*, and the Project 39 Report. As described therein, the problem is the result of a combination of factors, including (1) the implementation of cellular architecture by CMRS licensees, such as Nextel, operating on 809.75-816/854.75-861 MHz channels that are interleaved with public safety pool channels; (2) intermodulation and other interference caused by cellular licensees operating above 824/869 MHz; and (3) and the fundamental differences between commercial and public safety radio system equipment, operations, and architecture within the 800 MHz band.

The 800 MHz problem is severe, and extremely dangerous to public safety personnel and the general public. The interference occurs most often when a police officer, fire fighter or other "first responder" is using a low-power portable radio to communicate to a distant base station, but is also within a very short distance of a low-elevation cell site using adjacent band frequencies. The result is a "dead zone" around the cell-site (ranging from a few hundred feet to a quarter-mile) where public safety radio communications is disrupted. Even if known in advance, such a dead-zone could endanger public safety operations. However, the police officer, fire fighter, EMS technician or other first responder in the field is unlikely even to be aware that they are operating in a "dead zone" and could unknowingly be missing critical communication. Worse, they could be in a dangerous situation (*e.g.*, a crime-in-progress or building fire) and be unable to use their radio to call for assistance.

The following are just few examples of the more recently reported interference problems:

- Users in Sacramento County report numerous locations where their 800 MHz voice and data systems used to provide adequate service but now they experience loss of service in proximity to several commercial sites in their area.

- The Washington State Department of Transportation has reported multiple locations where coverage from their statewide has been compromised by commercial sites along critical highways or at large freeway interchanges.

- The New York City Transit Authority reports that coverage from their system has been virtually eliminated in a two block area around a Nextel site, and that further problem areas are anticipated as Nextel and other carriers continue to lower and further sectorize their sites.

- The Massachusetts State Police have documented numerous locations where their radios will not function when in proximity of Nextel sites.

APCO's Project 39 has documented many more examples, which we strongly believe are just the "tip of the iceberg."[4] Identifying the source of radio interference is extremely difficult under any circumstances, but especially where mobile public safety radio equipment is involved. Public safety agencies cannot simply cease operations and devote scarce resources to the difficult technical task of finding and eliminating interference. Moreover, the dynamic nature of many commercial radio systems make interference a "moving target" as cell site/frequency assignments are changing constantly.[5] The documented instances of interference are, therefore, just a sampling of the actual problem as it exists today, let alone as it will occur in the future if there is no significant corrective action.

The *Best Practices Guide* identifies certain strategies for finding and correcting 800 MHz interference problems once they occur. Some CMRS carriers have worked diligently, at least in some cases, to attempt to fix interference problems using these strategies. However, interference persists in many of those situations, and in others the corrective actions are, at best, short-term in nature. Interference will resurface even in the best of circumstances as CMRS cells become smaller, systems become more dynamic, and cell-site co-location becomes commonplace (which increases the amount of intermodulation). Nevertheless, while the Commission searches for a permanent solution, CMRS carriers must be required to take all necessary steps to resolve interference problems within the current allocations.

Even if corrective action had a very high success rate, it would be inadequate to solve the interference dilemma. Correcting interference problems only after-the-fact is unacceptable for

[4] Many of the interference reports cited by Project 39 are from very large 800 MHz system licensees (some covering an entire state), and actually reflect many instances of interference throughout the system.

[5] Additionally, the licensing of multiple channels at multiple CMRS sites would make any type of local solution difficult, if not impossible. The hundreds of 800 MHz channels that are licensed at many CMRS sites removes any

public safety radio systems. Anytime there is interference to a public safety system, there is the danger that life-saving communications will be disrupted. Such interference must be avoided BEFORE it occurs. Therefore, we do not believe that the solution to 800 MHz interference is merely to provide "tools" for CMRS licensees and public safety agencies to fix interference problems. While necessary, that is only an interim approach. The Commission must look at eliminating the causes of interference, not just ways for address interference after it occurs.

As described in the NPRM, much of the interference in the 800 MHz band is the product of the current allocations, which place public safety systems on channels adjacent to CMRS frequency blocks. That increases the potential for intermodulation and other forms of interference.[6] Therefore, we agree that solutions to the 800 MHz problem will likely require reconfiguration of the 800 MHz band, both as to the interleaved channels at 809.75-816 MHz and the "NPSPAC" channels at 816-821 MHz. Band reconfiguration alone will not "solve" the problem, but it will reduce substantially the potential for interference. It will also create a stable environment for additional long-term steps such as improvements in receivers and overall system design.

Band reconfiguration also creates an opportunity to explore spectrum allocations within the band, and to address in part the broader spectrum issues facing public safety systems across the nation. Therefore, before discussing various proposals to alter the 800 MHz band

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possibility of a local agency limiting the use of certain frequency's near the CMRS site in order to minimize interference generated by traditional inter-modulation products.

[6] Radio frequency intermodulation is a fact of life in 2-way radio receivers. Whenever two or more frequencies are present, the various mathematical combinations of their frequencies will create different frequencies in the receiver. These product signals are at lower power levels than the contributing frequencies, and the degree to which their power is lower is related to the complexity of the mix creating the product. Receivers are designed to reject a certain level of these intermodulation products since they are present at all times since the front-end filtering of the radio needs to be wide enough to cover the entire band used by the radio.

allocations, we will first identify public safety spectrum needs and why additional spectrum should be made available for public safety within the 800 MHz band.

II. PUBLIC SAFETY REQUIRES ADDITIONAL RADIO SPECTRUM.

The Commission, in paragraph 29 of the NPRM, acknowledges the work of the Public Safety Wireless Committee ("PSWAC") and its "groundbreaking assessment of public safety spectrum needs." In 1996, PSWAC identified a requirement for 97.5 MHz of additional public safety spectrum by 2010, including immediate needs for 2.5 MHz of interoperability spectrum and 25 MHz of mobile voice and data communications. The Commission notes that it has been more than five years since the completion of the PSWAC Report, and suggests that intervening factors and events may lead to different conclusions today. The Commission refers to the allocation of 24 MHz of public safety spectrum in the 700 MHz band, the allocation of 50 MHz in the 4.9 GHz band, advances in commercial radio services, and "spectrum refarming" to improve spectrum efficiency.

The reality, as discussed below, is that the developments cited in the *NPRM* have had minimal impact on meeting the spectrum requirements identified by PSWAC. Moreover, increased demand for public safety communications, driven in part by the events of September 11, suggests that PSWAC underestimated actual public safety requirements. One preliminary analysis indicates that actual public safety spectrum needs will be at least 32 MHz beyond that which PSWAC predicted.

A. <u>Public Safety Spectrum Needs Have Not Diminished Since The PSWAC Report.</u>

1. Spectrum Allocations Since 1996 Have Not Materialized.

The Commission cites two major allocations of additional public safety spectrum that have occurred since 1996, the 24 MHz in the 700 MHz band mandated by the Balanced Budget

Act of 1997, and the recent allocation of 50 MHz of spectrum in the 4.9 GHz band.[7] However, as to the 24 MHz, in most of the nation's major metropolitan areas, that spectrum is blocked by incumbent television broadcast stations operating on channels 63, 64, 68, and 69, and/or adjacent channels 62, 65, and 67 (see Exhibit 1). Current law allows those stations to remain on the air until December 31, 2006, or when at least 85% of television households in the relevant market have access to digital television signals, whichever is later.[8] As the Commission is well aware, the broad consensus among industry and government observers is that the 85% benchmark will not be reached until long after 2006, if ever. Therefore, for much of the nation, the 24 MHz allocation is not a reality, and may not be for many, many years to come.

The more recent allocation of 50 MHz in the 4.9 GHz band will be a valuable addition to public safety communications capability. However, the propagation characteristics of that band are such that its use will be limited to broadband transmissions over very short distances. The 4.9 GHz band will not be used for the type of wide-area voice or data transmissions that constitute the bulk of public safety communications.

2. Public Safety Use of Commercial Services Continues To Be Limited To Non-Mission Critical Communications.

The Commission also refers to the growth in commercial wireless services, which the Commission states "may be suitable for meeting the more routine public safety communication needs." If by the term "routine" the Commission is referring to "non-mission critical" communications, then the Commission is correct. Commercial services have been and will continue to be useful for those largely "administrative" communications which do not require the highest level of reliability, coverage, immediacy, or security. However, if the Commission is

[7] *NPRM* at ¶ 29.

[8] 47 U.S.C. § 309(j)(14).

using "routine" to refer to "normal" or "day-to-day" communication, then it is incorrect to suggest that such communication can be handled by commercial providers. The "routine," day-to-day job of public safety agencies is responding to constant emergencies and protecting the safety of life, health and property. Every day may not be as disastrous as September 11, but every day does create the need for "mission critical" communications for police, fire, EMS, and other first-responders, and such communications must, in most instances, be through radio systems that public safety agencies own, control, and maintain.[9]

The mission critical nature of most public safety communications limits the ability to use commercial systems other than in an administrative role. A public safety agency must have ubiquitous coverage over all of its area of jurisdiction, as emergencies can occur anytime, anyplace. That includes remote unpopulated areas, under bridges, in valleys (whether behind mountains or buildings), and deep inside large structures. In contrast, commercial systems can tolerate "holes" in areas that have few subscribers or would be expensive to provide cover with adequate signals.[10]

Public safety agencies also have a very low tolerance for system outages, and demand extremely reliable and hardened radio systems designed and built to provide redundancy and to withstand extreme conditions (*e.g.*, weather, earthquakes, fires). These requirements are generally well beyond what is necessary for a viable commercial system. Public safety

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[9] The PSWAC Final Report, at 47, defines "mission critical communication" as that which must be "immediate, ubiquitous, reliable and, in most cases, secure." As the Final Report further explains, "an 'immediate' communication must be capable of being transmitted and received simultaneously, without waiting for a system to be set up, a clear channel, or a dial tone. A 'ubiquitous' communication is that which can be transmitted and received through-out the area that the mission requires. A 'reliable communication must be designed, constructed, and maintained such that short-term disruptions are minimal."

[10] In designing public safety systems, extensive field tests are generally used to confirm the actual coverage (and building penetration), for each transmitter site, rather than relying on the predicted coverage area based on various theoretical models.

personnel must also have immediate "access" to radio communications capability. A police officer or firefighter in the field dealing with a life-threatening emergency obviously cannot simply wait for a call to be set up or a channel to clear before using their radio.

Agency control over their radio systems is also essential, especially during major emergencies when channels and other resources must be reallocated to provide sufficient capacity for the first responders. Commercial systems generally lack such flexibility and, in any event, are subject to extreme congestion during the same major emergencies to which public safety personnel must respond. Finally, law enforcement and other public safety agencies are increasingly demanding a level of system security that is difficult to achieve on a commercial system available to the general public.

We emphasize however, that commercial systems do have a role for public safety communications, primarily for non-mission critical communications. Indeed, availability of commercial services was a factor in the PSWAC recommendations cited by the Commission. The PSWAC Final Report estimated that 10% of future public safety needs could be accommodated on commercial systems, and adjusted its model accordingly. *See* PSWAC Final Report at 56 (Section 4.4.8).

In a footnote, the Commission also refers to the voluntary "priority access" that wireless carriers are permitted to provide to public safety entities.[11] However, that is intended to provide government officials with access to commercial wireless service in the aftermath of a major emergency, such as that which occurred on September 11. Priority access will not serve the mission critical communications needs of "first responders" such as police, fire, and EMS

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[11] *NPRM* at n.69.

personnel. Nor does priority access address public safety communications needs for day-to-day emergencies.

3. Spectrum Refarming Has Not Diminished Public Safety Spectrum Needs.

The Commission also cites "spectrum refarming," a process by which existing channels are divided in half, and then in half again, to create additional channels for land mobile radio communication. However, spectrum refarming and anticipated improvements in spectrum efficiency were already considered by PSWAC in making its spectrum needs recommendations. *See* PSWAC Final Report at 56, (4.4.10). Moreover, the reality is that spectrum refarming has actually yielded far less efficiency than PSWAC had projected. Very little actual benefit has occurred from the Commission's refarming rules, in large part because licensees are not required to convert systems to narrowband operation, and equipment manufacturers may continue to market previously type-accepted equipment lacking narrowband capability. Thus, most licensees on bands impacted by refarming (*i.e.*, those below 512 MHz) continue to operate on 25 kHz or 30 kHz channels. Furthermore, for refarming to yield additional spectrum, all of the users of adjacent channels in the same geographic region must convert to narrowband, a slow and arduous process, especially for public safety agencies that depend upon public funds.[12] In short, spectrum refarming has not led to significant improvements in spectrum utilization or availability.

Indeed, a more recent and realistic analysis of spectrum efficiency suggests that PSWAC underestimated public safety spectrum needs, at least for voice, "narrowband" data, and

[12] For example, if the user of a 25 kHz channel converts to narrowband, it will now be operating on 12.5 kHz in the center of the original 25 kHz wide channel, "creating" 6.25 kHz of available space on both ends of the original channel. That 6.25 kHz of spectrum is useless, however, unless the licensee of the adjacent 25 kHz channel also converts to narrowband, allowing the 6.25 kHz of spectrum at the ends of both channels to be combined into a "new" 12.5 kHz channel.

status/messaging. Several APCO members who had served on the PSWAC Spectrum Requirements Subcommittee have revisited the original calculations, inserting more accurate estimates of spectrum efficiency (see Exhibit 2). The result of that recalculation is that public safety actually requires 32 MHz of spectrum beyond the 1996 PSWAC recommendations.

B. Spectrum Needs Have Actually Grown Faster Than PSWAC Had Estimated.

There are several additional factors suggesting that PSWAC may have underestimated public safety requirements. For example, public safety demand for data (*e.g.*, mugshots, fingerprints, building diagrams, medical images and information) in the field has increased faster than most had anticipated. Due in large part to rapid developments in computer processing speeds, dramatic cost reductions for mobile/portable computer hardware, deployment of broadband wireline networks, and the plethora of databases now available via the Internet, the information that public safety personnel need is being collected and transmitted at lightening speeds (at least to fixed locations). As that data becomes widely available, it becomes a more critical part of public safety operations. That in turn, increases demand to make such data available in the field, which, of course requires adequate radio spectrum for mobile data systems.

Changes in law enforcement and other public safety operations have also increased demand for communications. Community policing strategies, and simply putting more officers "on the street" to deter and combat crime has become standard operating procedures in many police departments across the country, especially those serving densely populated major metropolitan areas. However, those strategies and procedures require many more portable radios in the field, multiplying the number of transmissions per day, and thus further taxing overburdened radio systems in many cases.

Sadly, the events of September 11 have also placed new demands on public safety agencies, and their radio communications operations. Heightened levels of security at airports, train stations, seaports, bus terminals, bridges, stadiums, parks, public buildings, and at public events of all types requires more personnel, and careful coordination of scarce resources. That in turn requires more communications. In addition, effective security measures in today's world requires rapid and efficient background checks and exchange of data, photos, fingerprints and other forms of identification. Achieving that level of security at isolated "checkpoints" often requires wireless mobile data networks and dedicated, secure radio channels.

The recent tragedies have also placed heightened responsibility on first responders who may be called upon in the event of another terrorist attack or other major disaster. Fire departments, hazardous materials teams, urban search and rescue operations, emergency medical technicians and other public safety responders are beefing up staff and capabilities. Again, that increases demand on communications systems and infrastructure.

Finally, and perhaps most importantly, all of these post-September 11 developments highlight the need for interoperability among all of the public safety personnel likely to respond to a particular incident. The need for interoperability occurs not only when major disasters strike, but also on a daily basis when accidents, fires, crimes, and other "normal" emergencies require personnel from different agencies or jurisdictions to communicate in the field. All too often they cannot, typically because they operate in different portions of the radio spectrum.[13]

[13] Most public safety radio systems operate in the VHF High Band (150-170 MHz), UHF Band (450-470 and 470-512), or 800 MHz band. Radio equipment that spans more than one of these frequency bands does not exist, and would in any event be extraordinarily expensive and have substantial size, antenna, and battery power limitations. Several technologies do exist to "patch" two otherwise incompatible radio systems together at their dispatch or control points, and these can be useful interim solutions. However, such "infrastructure-dependent" solutions assume that the field personnel attempting to communicate with each other are both within range of their "home" base stations, and that the emergency to which they are responding has not damaged either of their systems' infrastructures (*i.e.*, base stations, microwave or fiber backbone, and dispatch centers). Effective interoperability

The lack of radio spectrum has forced public safety agencies across the nation to operate in whatever spectrum they can find, which is often in bands that are incompatible with their neighboring agencies or others with whom they must interoperate on a regular basis. One of the most effective ways to address interoperability is through the development of wide-area, multi-agency radio systems, such as those that have been deployed in the 800 MHz band in many parts of the nation. Such systems strive to incorporate all of the agencies in a region, cutting across services (*i.e.*, police, fire, EMS) and jurisdictional boundaries (*i.e.*, cities, counties, and states). "Mutual aid" or "interoperability" channels can be easily established on these systems (which are usually "trunked"), allowing all agencies on the system (and others on nearby 800 MHz systems with compatible equipment) to communicate directly in the field. These trunked radio systems are generally more spectrum efficient (trunking capability maximizes use of otherwise quiet channels), and cost efficient as many agencies are able to share the cost of infrastructure.

Many large cites, counties, and states want to develop new or expanded 800 MHz wide area, multi-agency radio systems. However, they simply do not have enough spectrum available for new systems and capacity, especially in heavily populated areas**.** The 800 MHz band (as well as other public safety channels) is fully occupied in much of the nation, including virtually all major metropolitan areas.[14] The 700 MHz band is intended to accommodate similar systems.

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requires that radios used in the field be able to communicate directly, radio-to-radio, regardless of location or availability of system infrastructure. That requires the field radios to operate in the same frequency band.

[14] APCO, a certified frequency coordinator, recently conducted sample frequency searches for 800 MHz channels in several major metropolitan areas, and confirmed the lack of channel availability (detailed documentation available to the Commission upon request). The Commission itself has also confirmed the lack of available public safety spectrum in several cases in which waivers were granted to permit public safety use of non-public safety spectrum. *See*, *e.g.*, South Bay Regional Public Communications Authority, *Memorandum Opinion and Order*, 13 FCC Rcd 23781 (1998); County of San Mateo, California, *Memorandum Opinion and Order*, 14 FCC Rcd 19002 (1999); City of Pomona, California, *Order*, 15 FCC Rcd 15597 (2000); and County of Burlington, New Jersey, *Order on Reconsideration*, 15 FCC Rcd 16569 (2000); County of Sacramento, California, *Order on Reconsideration*, 15 FCC Rcd 12600 (2000); City of Santa Monica, California, *Order*, 15 FCC Rcd 24938 (2000); Dupage Public Safety Communications, *Memorandum Opinion and Order*, 16 FCC Rcd 12394 (2001); State of Ohio, *Memorandum Opinion and Order*, DA 01-3035 (released January 7, 2002).

However, as noted above, the 700 MHz band is blocked by broadcast stations in many major metropolitan areas, and is unavailable until some future, unknown date. Thus, allocating additional 800 MHz spectrum for public safety may be the only way to accommodate current and future public safety spectrum needs.

III. ANALYSIS OF PROPOSALS TO RECONFIGURE THE 800 MHz BAND

The Commission seeks comments on two submitted proposals, and invites parties to offer other alternatives. While various parties have discussed draft alternative plans with us, we limit these initial comments to those plans currently on the record and discussed in the NPRM. Our comments will examine the Nextel plan, the National Association of Manufacturers ("NAM") plan, as well as a variation noted by the Commission. Other alternatives will be addressed in our reply comments. In each case, we will examine the (1) degree to which each plan addresses the 800 MHz interference problem; (2) the difficulty of implementing each plan and whether provisions are made to reimburse public safety licensees for the cost of implementation; and (3) whether the plan provides additional spectrum for public safety communications. Thereafter, in Section IV, we will explore several issues that, to varying degrees, are common to any band reconfiguration plan that might be adopted.

A. The Nextel Plan

Nextel has put forward an ambitious plan that has many positive attributes for public safety. It would result in a substantial reduction in interference, it attempts to address the

substantial costs of implementation (at least for public safety licensees), and it would yield approximately 10 MHz of additional public safety spectrum.

Importantly, Nextel acknowledges that its CMRS operations are a principal cause of the interference to public safety systems. To address that problem in a comprehensive fashion, Nextel proposes to reconfigure the band to eliminate interleaving of public safety and CMRS operations at 809.75-816/854.75-861 MHz. The plan correctly recognizes that public safety users in the 821-824/866-869 MHz band (the "NPSPAC" channels) are also subject to interference, both from Nextel and from cellular licensees operating above 824/869 MHz. While the initial 800 MHz interference problems were in the interleaved channels, research by Project 39 and others indicates that NPSPAC channels are also susceptible to interference. Thus, Nextel proposes to move all NPSPAC licensees to the lower portion of the band. The result would be a contiguous block of public safety spectrum with just one "band edge" with CMRS, which can be further diminished through the use of a guard band.

As discussed above in Section I, a band plan such as that proposed by Nextel would reduce substantially the potential for interference. Nextel acknowledges in its "White Paper" that additional steps would be needed in the long run to eliminate interference altogether. However, without first addressing the current convoluted band plan, such long-term solutions are of little value.

One of the potential benefits of the Nextel plan is that it creates a block of 800 MHz public safety spectrum that is contiguous with the 700 MHz public safety allocation. That will greatly facilitate interoperability and reduce equipment costs (radios would have to "span" a smaller range of spectrum) in those areas where the 700 MHz band is available today, and

hopefully throughout the nation at some future date when the 700 MHz is finally cleared of television broadcast stations.

The other major benefit of the plan, of course, is that it results in a net gain of approximately 10 MHz of public safety spectrum. As described above in Section II, public safety users need this additional spectrum to reduce congestion in major metropolitan areas, provide new data communications tools, and to enhance interoperability by providing spectrum for additional wide-area, multi-jurisdictional operations. The 700 MHz band allocation was intended to address these needs, but that spectrum is blocked indefinitely in most of the heavily populated areas of the nation, which is exactly where the spectrum is needed the most.

Nextel's plan provides additional public safety spectrum by reducing Nextel's own use spectrum that it purchased in the 800 MHz band, but also by converting other non-public safety licensees to "secondary status" and offering them the opportunity to move to spectrum that Nextel would relinquish in the 700 MHz and 900 MHz bands. We recognize the potential hardship that this may cause for these licensees, some of whom provide important communications for critical infrastructure industries. Therefore, we would welcome consideration of alternatives that mitigate the impact on non-public safety users, while preserving the ability of public safety licensees to obtain additional spectrum to address their vital interoperability and overall communications needs.

Of course, the Nextel plan also imposes substantial costs on public safety licensees, especially those operating in the NPSPAC channels (most of which are fairly new systems). In most instances, the band reconfiguration can be accomplished without replacing radio equipment. However, virtually all existing radios would need to be reprogrammed and certain other modifications may be necessary to base stations. There would also be significant

engineering, frequency planning, and frequency coordination expenses for such a massive relocation of mobile radio systems. As discussed below, the logistics of this or any similar plan are also quite daunting, and would require substantial expenditure of time and resources by public safety agencies.

Nextel has pledged to provide up to $500 million to cover the costs incurred by public safety licensees, and suggests that the balance of the needed funds come from other CMRS licensees and federal grant programs. As discussed below, we believe that $500 million will not be sufficient and, in any event, there should not be an arbitrary cap on the total amount of reimbursements. Rather there should be guidelines for what expenses are reimbursable, without a cap on total overall payments. There will also need to be regulatory guarantees that Nextel and others fulfill their financial commitments before public safety agencies incur expenses. A mere promise to contribute $500 million is inadequate.

Nevertheless, an important attribute of the Nextel plan is that it at least contemplates a substantial source of funds. Plans that merely reconfigure that band may appeal to engineers and frequency planners, but are of little value unless funds are made available to achieve the reconfiguration.

In conclusion, the Nextel plan offers an improved band plan that reduces interference, provides badly needed radio spectrum for public safety contiguous with existing allocations, and at least opens the door for the provision of funds necessary to cover costs incurred by public safety licensees in the band. Note, however, we and other public safety organizations have made clear, and continue to insist, that any plan to move public safety operations must include provisions for <u>full</u> reimbursement of public safety agencies' costs.

B. The NAM Proposal

The NAM proposal would also make major changes to the band to alleviate interference to public safety systems. However, the plan does not provide any additional public safety spectrum, and does not even address the issue of cost.

NAM proposes to shift all 800 MHz public safety licensees to the lower portion of the 800 MHz band. It would eliminate interleaving of public safety and non-public safety licensees, and create three new spectrum blocks in the band: Public Safety, SMR and Business/Industrial Land Transportation, and Digital (cellular architecture) SMR. Public safety licensees would thus be separated within the band from cellular-type operations, which are a major cause of interference. As with the Nextel plan, there would be a single block of public safety spectrum, contiguous with the 700 MHz band.

While the NAM plan is certainly less disruptive to non-public safety licensees, it is actually somewhat more disruptive to public safety users than the Nextel Plan. Under the NAM proposal, public safety licensees on interleaved channels above 811/856 MHz would be required to relocate to lower frequencies. The Nextel Plan, depending upon its specific implementation, would allow most of those licensees to remain on their current frequencies.

Of critical importance, the NAM proposal does not provide public safety with additional spectrum. Rather it preserves current allocations in the band, though not necessarily current usage. Over the years a large number of Business and Industrial/Land Transportation channels were acquired by Nextel and others who converted the channels to digital SMR operation. The NAM proposal to allocate 10 MHz for analog SMR, Business and Industrial/Land Transportation licensees appears to be an effort to erase that history and recreate an allocation that no longer exists in its original form, and may no longer be necessary to meet the needs of Business and Industrial/Land Transportation users of the band.

Finally, the NAM proposal does not provide any mechanism for addressing the substantial costs that public safety agencies would incur in implementing the plan.

C. "Other Options"

The NPRM invites parties to submit other proposals and, as an example, poses the option of simply untangling the interleaved channels to create three frequency blocks (Public Safety, Business and Industrial/Land Transportation, and SMR). However, the plan also leaves the NPSPAC channels in place, which obviously reduces disruption to public safety users, but does not address the interference problems facing those NPSPAC licensees. Finally, the plan does not address the cost of the band reconfiguration.

We look forward to reviewing other options that are likely to be filed in the initial comments of other parties. In each case, we will consider the extent to which the plans address the interference problem, the cost of band reconfiguration, and the spectrum needs of public safety.

IV. ISSUES COMMON TO ALL BAND MODIFICATION PLANS

The NPRM raises issues at several points which will arise to varying degrees regardless of which band plan is adopted. These issues include the cost of restructuring the 800 MHz band, who pays, and how cost reimbursement should be managed. Other common issues include frequency coordination and planning the significant movement of licensed facilities, special issues related to the Canadian and Mexican border regions, whether "spectrum refarming" should be made part of the restructured 800 MHz band, and whether there should be an interoperability channel requirement similar to that adopted for the 700 MHz band.

Each of these issues will be addressed below, at least in a preliminary manner. The very short comment period does not provide sufficient time to explore these issues in the detail that

will ultimately be necessary. Therefore, we plan to revisit these issues in reply comments and/or written *ex parte* communications at a later date.

A. Cost Related Issues

The cost of any particular band plan is extremely difficult to estimate for several reasons. The actual volume of equipment in use in the field is difficult to ascertain, and sometimes has little relationship to information contained in the FCC's license database.[15] While we believe that the majority of radios can be reprogrammed, rather than replaced, the cost of implementing that reprogramming is unknown, as is the actual number of radios that will need replacement. Moreover, the cost to each licensee will vary greatly depending upon the age, sophistication, and complexity of its system design and architecture.

We continue to examine the total cost issue, as we recognize that it is an important factor for the Commission's consideration. We note that Motorola, by far the largest supplier of 800 MHz equipment, has provided us and other parties with estimates that the cost to public safety of either the Nextel plan or the NAM plan is approximately $1 billion. This estimate is based upon an analysis of the FCC's database, Motorola's internal equipment distribution data, and an educated estimate that 60-70% of existing public safety radios could be re-tuned, and need not be replaced.

Any cost estimate is just that, an estimate. Therefore, we do not believe that there can be an arbitrary limit on total reimbursement of public safety expenses. Rather, as the Commission suggests in paragraph 42, there will need to be guidelines as to what costs are subject to reimbursement. These guidelines should include not only "hard costs" such as equipment, site modifications and re-tuning costs, but also "soft costs" such as engineering, frequency

[15] Once a licensee reaches minimum loading levels, there is little incentive to update its license information to show additional units.

coordination, legal, and administrative costs. Indirect, internal costs also need to be considered, as implementing changes such as those being proposed will inevitably require substantial amounts of internal staff time and/or consulting fees to ensure that the modified system continues to meet local public safety communications requirements. An important factor is that most current 800 MHz systems were very carefully engineered to maximize spectrum efficiency and ensure adequate signal coverage. Any "re-engineering" costs necessary to maintain at least comparable service for those systems must be reimbursable. Finally, where re-tuning is not possible, the full cost of comparable replacement equipment must also be subject to reimbursement.

Who pays the cost of relocation is of course a critical issue. We believe that the principal responsibility rests with those licensees that have developed commercial systems using cellular architecture in the 800 MHz band. Those are the entities that have benefited financially from operations that cause interference to public safety radio systems. While Nextel is certainly not alone in that regard, its conversion of 800 MHz channels from analog dispatch to digital SMR operations using cellular architecture has been a major cause of the interference problem plaguing the 800 MHz band. Cellular operations above 824/869 MHz also bear significant responsibility.

Finally, regardless of how the funds originate, there will be important issues to resolve regarding the administration and distribution of those funds. One option is a clearinghouse approach, whereby the Commission certifies a non-profit entity to operate a clearinghouse that receives and processes reimbursement claims submitted by public safety agencies, pursuant to Commission approved or adopted guidelines. A key factor in such a clearinghouse approach is that publicly funded agencies will require assurances that reimbursement funds are available

before incurring actual expenses. Another option is to require Nextel and other responsible CMRS licensees to enter into agreements with each 800 MHz licensee to cover relocation costs, subject to FCC guidelines and oversight (similar to the 2 GHz relocation process). We are still examining these and other options, and will present more detailed recommendations at a later date.

B. Frequency Coordination and Regional Planning.

Nextel proposes that the FCC designate "super coordinators" for public safety and other 800 MHz licensees to implement the reconfiguration of the band. We question the need for creating another administrative entity, and suggest that the current public safety frequency coordinators are probably best equipped to manage the shifting of frequency assignments. They are the entities most familiar with the special needs and requirement of public safety licensees. Frequency coordination fees will certainly need to be included among the costs subject to reimbursement.

The NPSPAC channels pose a unique challenge, as frequency assignments were very carefully planned through the Regional Planning Committees (RPCs) established by the FCC. Any movement of those operations to alternative channels will need to maintain the original plan to the maximum extent possible, and thus will require involvement by the (RPCs). However, RPCs should also be provided the opportunity to re-adjust plans to reflect updated needs and improvements in spectrum efficiency.

C. Border Issues

The Canadian and Mexican border areas pose additional challenges for any modification to the 800 MHz band plan, due to the restricted channel allotments in those areas. *See* 47 C.F.R. § 90.619. The State of New York is submitting comments that include a possible Canadian

border area variation of the Nextel plan. The proposed variation attempts to replicate the end result of the Nextel proposal within the confines of the Canadian border allotments, and in light of the long-term restrictions on public safety use of the 700 MHz band in that area. Similar approaches need to be considered for the Mexican border region.

D. Spectrum Refarming

The Commission, in paragraph 28, asks whether users relocated to other channels should be required to implement narrowband (12.5 kHz) operation. We support the concept of "spectrum refarming" as a method to improve efficiency. However, narrowband operation should not be required in this context, unless the user can shift to narrowband operation without acquiring new equipment. For example, if a public safety user is able to "re-tune" existing equipment that does not have 12.5 kHz capability, then it should not be forced to incur the added expense of acquiring new 12.5 kHz equipment at the same time. However, licensees that now have 12.5 kHz equipment, but operate on 25 kHz channels, should be required to convert to narrowband as part of the re-tuning process. Similarly, new equipment installed should also operate at 12.5 kHz to maximize efficient channel utilization.

E. Interoperability Requirements

In paragraph 30, the Commission asks whether additional interoperability channels should be designated within the reconfigured 800 MHz band, whether a common modulation protocol should be required (*e.g.*, Project 25), and whether all new 800 MHz radios should be required to operate on the interoperability channels. These are all valid concerns, and reflect the interoperability requirements that the FCC wisely adopted for the 700 MHz band. However, we believe that adopting these requirements for 800 MHz is premature. A better approach may to be

accomplish the band reconfiguration (or at least finalize a plan), and then explore whether these or other interoperability requirements should be adopted for 800 MHz users. Adopting new equipment requirements now may be especially burdensome, since most existing public safety equipment can be re-tuned, without being replaced, as part of the band restructuring.

V. COMPLIMENTARY SOLUTIONS

The *Best Practices Guide*, the Nextel "White Paper" and others generally agree that restructuring the 800 MHz band will substantially reduce, but not eliminate the danger of harmful interference to public safety licensees. Some of the additional "complimentary solutions" identified in the *NPRM* (paragraphs 73-79) include receiver standards, out-of-band emissions (OOBE) limits, creating more "robust" public safety transmission levels, and reducing CMRS signal levels.

The public safety community has long supported the use of receiver standards to reduce interference and improve spectrum efficiency. We agree that such standards are likely to be necessary for future 800 MHz equipment. However, that is a long-term solution which cannot occur until after the band is restructured, hopefully with a reduction in the range of frequencies that public safety radios need to span. For example, current public safety equipment must be able to operate in the entire 800 MHz band, whereas some of the proposed band plans would move public safety into a contiguous block at the lower end of the band.

We also continue to support stringent limits on OOBE from CMRS transmitters operating in bands near public safety spectrum allocations. We look forward to the recommendations of various manufacturers and others regarding specific OOBE levels that should be adopted.

Improving the "interference environment" by increasing public safety signal levels, while reducing CMRS signal levels, is also a potential long-term solution. However, making public

safety signals “more robust” is likely to require additional transmitter sites, adding substantially to the cost of new public safety systems (and posing additional “environmental assessment” issues). Public safety signal levels could also be increased by raising power levels and/or antenna heights. However, that would also expand coverage areas for each transmitter, potentially limiting channel re-use and spectrum efficiency.[16]

[16] The received signal level at any location is directly related to the transmitter power level of the transmitter servicing that location. Thus, as the "desired" signal level is increased to improve the "C" portion of the C/I ratio, the transmitter power level must be increased. This then results in an increase in the transmitter power appearing in adjacent channels as permitted under Section 90.210 of the FCC Rules. Thus, while the increase in transmitter results in an increase in the "C" for the on-channel receiver, it also results in an increase in the "I" for adjacent channel receivers. This could result in a chasing one's tail" situation of entity A increases its signal to overcome interference coming from entity B, then entity B increases its signal to overcome the increased interference coming from entity A, etc.

CONCLUSION

APCO, NACo, NLC, and NATOA urge the Commission to act swiftly to adopt comprehensive modifications to the 800 MHz band that (a) will reduce the potential for dangerous interference, (b) provides a mechanism to reimburse fully the substantial costs to be incurred by public safety agencies, and (c) provides additional spectrum to address the critical needs of police, fire, EMS, and other public safety agencies throughout the nation.

Respectfully submitted,

ASSOCIATION OF PUBLIC-SAFETY COMMUNICATIONS OFFICIALS-INTERNATIONAL, INC.

NATIONAL ASSOCIATION OF COUNTIES

NATIONAL LEAGUE OF CITIES

NATIONAL ASSOCIATION OF TELECOMMUNICATIONS OFFICERS AND ADVISORS

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